Atmospheric moisture transport and fresh water flux over oceans derived from spacebased sensors

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Column-integrated moisture transport (IMT) in the atmosphere over global oceans is estimated from spacebased measurements of ocean surface wind vector (SWV) fields by QuikSCAT and integrated water vapor (IWV) by TRMM. Direct calculation of IMT requires vertical profiles of wind vector and specific humidity, which traditionaly come from rawindsondes. Over the ocean, rawindsondes are sparse. IMT can also be writted as the product of IWV and an equivalent velocity (EV). EV is the depth-averaged wind velocity weighted by humidity. In this study, a statistical relation between SWV and EV is derived using one year of wind and humidity profile over global oceans from NCEP reanalysis, and validated by in situ measurements from a set of representative rawindsonde stations. Such derived statistical relation is then applied to spacebased measurements of SWV and IWV to obtain estimation of IMT over global ocean at resolution of 0.5x0.5 degree, twice daily. Moreover, the divergence of IMT fields gives to the difference between precipitation (P) and evaporation (E), which equals to ocean surface fresh water flux, under stationary condition. The balance between P, E and IMT affects the global hydrological balnce and governs the thermohaline circulation in the oceans.

Preliminary results will be shown to demostrate the application of spacebased IMT and fresh water flux in ocean-atmosphere-land interaction studies, such as the hydrologica balance on Amazon rainfall and Indian monsoon.